

Penn Cambria Curriculum

Course Name	Academic Math 11
Length of Course	1 credit (1 period per day for 1 semester in block schedule)
Grade Level	11
Prerequisites	**This course is only open to juniors
Course Description	This course will concentrate on the foundational math skills contained in the Pennsylvania Academic Standards for Mathematics to provide students with a solid, well-rounded mathematics experience. There will be emphasis on assessment anchors dealing with operations with real numbers and expressions, linear equations and inequalities, coordinate geometry, functions, and data analysis. All juniors are encouraged to take this class.
Units of Study	Operations with Real Numbers and Expressions Linear Equations Linear Inequalities Functions Coordinate Geometry Data Analysis
Materials	Text: None Supplemental Materials: Resources from adopted mathematics textbooks

Unit 1: Operations with Real Numbers and Expressions

Estimated Time: 22 days (suggested time for each objective given in parenthesis)

2012 Draft PA Common Core Standards:

2.1.6.E.3	2.2.7.B.3	2.2.HS.D.5
2.1.8.E.1	2.2.8.B.1	2.2.HS.D.6
2.1.8.E.4	2.2.HS.D.1	2.2.HS.D.9
2.1.HS.F.1	2.2.HS.D.2	
2.1.HS.F.2	2.2.HS.D.3	

Curricular Objectives:

A. Students will:

- M11.A.1.1.2 – Express numbers and/or simplify expressions using scientific notation (including numbers less than 1). (1 day)
- M11.A.1.3.1 - Locate/identify irrational numbers at the approximate location on a number line. (1/2 day)
- A1.1.1.1.1 Compare and/or order any real numbers. Note: Rational and irrational may be mixed. (1/2 day)
- M11.A.1.1.1 - Find the square root of an integer to the nearest tenth using either a calculator or estimation (1/2 day)
- A1.1.1.1.2 Simplify square roots (e.g., $\sqrt{\quad}$) (2 days)
- M11.C.1.4.1 - Find the measure of a side of a right triangle using the Pythagorean Theorem (Pythagorean Theorem included on the reference sheet). (1 day)

- g. A1.1.1.2.1 Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. (1 day)
- h. M11.A.2.2.2 – Simplify/evaluate expressions involving multiplying with exponents (e.g., $x^6 \cdot x^7 = x^{13}$), powers of powers (e.g., $(x^7)^2 = x^{14}$) and powers of products $(2x^2)^3 = 8x^6$ (positive exponents only) (1 day)
- i. A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10. (2 days)
- j. A1.1.1.5.1 Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial. (2 day)
- k. A1.1.1.5.2 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials are limited to the form ax^2+bx+c where a is equal to 1 after factoring out all monomial factors. (3 days)
- l. M11.D.2.2.2 - Solve quadratic equations using factoring (integers only – not including completing the square or the Quadratic Formula). (1 day)
- m. A1.1.1.5.3 Simplify/reduce a rational algebraic expression. (1 day)
- n. M11.A.3.1.1 – Simplify/evaluate expressions using the order of operations to solve problems (any rational numbers may be used). (throughout)
- o. A1.1.1.4.1 Use estimation to solve problems. (throughout)

Assessments/ Measurement of Objectives:

- Open- ended responses
- Multiple choice tests
- Teacher created test
- Classroom exercises
- Independent problems

Suggested Methods of Instruction / Learning Activities:

- Resources from *Algebra I* (Larson). Chapters 2, 8, 9, 11, 12
- Infinite Algebra I, Infinite Algebra 2, and Infinite Geometry Programs

Unit 2: Linear Equations and Coordinate Geometry

Estimated Time: 21 days (suggested time for each objective given in parenthesis)

2012 Draft PA Common Core Standards:

2.1.HS.F.3	2.2.8.C.2	2.2.HS.D.7
2.1.HS.F.4	2.2.HS.C.1	2.2.HS.D.8
2.1.HS.F.5	2.2.HS.C.3	2.2.HS.D.9
2.2.8.B.3	2.2.HS.C.5	2.2.HS.D.10
2.2.8.C.1	2.2.HS.C.6	2.4.HS.B.2

Curricular Objectives:

A. Students will:

- A1.2.2.1.1 Identify, describe, and/or use constant rates of change. (1 day)
- A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems. (1 day)
- A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, two points on the line, or the slope and a point on the line. Note: Linear equation may be in point slope, standard, and/or slope-intercept form. (3 days)
- A1.2.2.1.4 Determine the slope and/or y-intercept represented by a linear equation or graph. (1/2 day)
- M11.C.3.1.2 – Relate slope to perpendicularity and/or parallelism (limit to linear algebraic expressions; slope formula provided on the reference sheet) (1 day)
- M11.D.2.1.2 - Identify or graph functions, linear equations or linear inequalities on a coordinate plane. (4 days)
- A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations). (1 day)
- A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. (1/2 day)
- A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. (4 days)
- A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations. (1 day)
- M11.C.3.1.1 – Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane (formula provided on the reference sheet) (1 day)
- A1.2.2.2.1 Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot. (1 day)
- M11.D.3.1.2 - Determine how a change in one variable relates to a change in a second variable (e.g., $y=4/x$, if x doubles, what happens to y ?). (1 day)
- M11.A.3.1.1 – Simplify/evaluate expressions using the order of operations to solve problems (any rational numbers may be used). (throughout)

Assessments/ Measurement of Objectives:

- Open- ended responses
- Multiple choice tests
- Teacher created tests
- Classroom exercises
- Independent problems

Suggested Methods of Instruction / Learning Activities:

- Resources from *Algebra I* (Larson). Chapters 3, 4, 5, 7, 11
- Infinite Algebra I, Infinite Algebra 2, and Infinite Geometry Programs
- GeoGebra

Unit 3: Linear Inequalities

Estimated Time: 8 days (suggested time for each objective given in parenthesis)

2012 Draft PA Common Core Standards:

2.2.HS.D.7

2.1.HS.F.5

2.2.HS.D.10

2.2.HS.D.9

2.2.HS.D.10

2.1.HS.F.5

2.2.HS.D.10

2.1.HS.F.5

Curricular Objectives:

B. Students will:

- a. A1.1.3.1.2 Identify or graph the solution set to a linear inequality on a number line. (1 day)
- b. A1.1.3.1.1 Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). (2 days)
- c. A1.1.3.1.3 Interpret solutions to problems in the context of the problem situation. Note: Limit to linear inequalities. (1/2 day)
- d. A1.1.3.2.1 Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. (2 days)
- e. A1.1.3.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities. (1/2 day)

Assessments/ Measurement of Objectives:

- Open- ended responses
- Multiple choice tests
- Teacher created tests
- Classroom exercises
- Independent problems

Suggested Methods of Instruction / Learning Activities:

- Resources from *Algebra I* (Larson). Chapters 6, 7
- Infinite Algebra I, Infinite Algebra 2, and Infinite Geometry Programs
- GeoGebra

Unit 4: Functions

Estimated Time: 8 days (suggested time for each objective given in parenthesis)

2012 Draft PA Common Core Standard Alignment:

2.1.HS.F.3

2.2.HS.C.1

2.2.HS.C.4

2.1.HS.F.4

2.2.HS.C.2

2.2.HS.C.6

2.2.8.B.2

2.2.HS.C.3

2.4.HS.B.2

Curricular Objectives:

A. Students will:

- a. A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. (1 day)
- b. A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph. (1/2 day)
- c. A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). (1 day)
- d. A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. (1 day)
- e. A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation). (1 day)
- f. M11.A.3.1.1 – Simplify/evaluate expressions using the order of operations to solve problems (any rational numbers may be used). (throughout)

Assessments/ Measurement of Objectives:

- Open- ended responses
- Multiple choice tests
- Teacher created tests
- Classroom exercises
- Independent problems

Suggested Methods of Instruction / Learning Activities:

- Resources from *Algebra I* (Larson). Chapters 1, 3, 4, 5
- Infinite Algebra I, Infinite Algebra 2, and Infinite Geometry Programs
- GeoGebra

Unit 5: Data Analysis

Estimated Time: 16 days (suggested time for each objective given in parenthesis)

2012 Draft PA Common Core Standard Alignment:

2.4.HS.B.1

2.4.HS.B.4

2.4.HS.B.7

2.4.HS.B.3

2.4.HS.B.5

Curricular Objectives:

A. Students will:

- a. M11.E.2.1.1 - Calculate or select the appropriate measure of central tendency (mean, mode or median) of a set of data given or represented on a table, line plot or stem-and-leaf plot. (2 days)
- b. A1.2.3.1.1 Calculate and/or interpret the range, quartiles, and interquartile range of data. (1 day)
- c. M11.E.2.1.3 - Describe how outliers affect measures of central tendency. (1/2 day)
- d. M11.E.1.1.1 - Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots or scatter plots. (1/2 day)
- e. A1.2.3.2.2 Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations). (1/2 day)
- f. A1.2.3.2.1 Estimate or calculate to make predictions based on a circle, line, bar graph, measures of central tendency, or other representations. (2 days)
- g. A1.2.3.2.3 Make predictions using the equations or graphs of best-fit lines of scatter plots. (1/2 day)
- h. M11.E.3.1.2 - Find, convert and/or compare the probability and/or odds of a simple event. (1 day)
- i. A1.2.3.3.1 Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent. (3 days)
- j. M11.E.4.1.2 - Use probability to predict outcomes. (1/2 day)
- k. M11.A.3.2.1 – Use estimation to solve problems. (throughout)

Assessments/ Measurement of Objectives:

- Open- ended responses
- Multiple choice tests
- Teacher created tests
- Classroom exercises
- Independent problems

Suggested Methods of Instruction / Learning Activities:

- Resources from *Algebra 1*(Larson). Chapters 13
- Infinite Algebra I, Infinite Algebra 2, and Infinite Geometry Programs
- Statistics Project